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† Deceased

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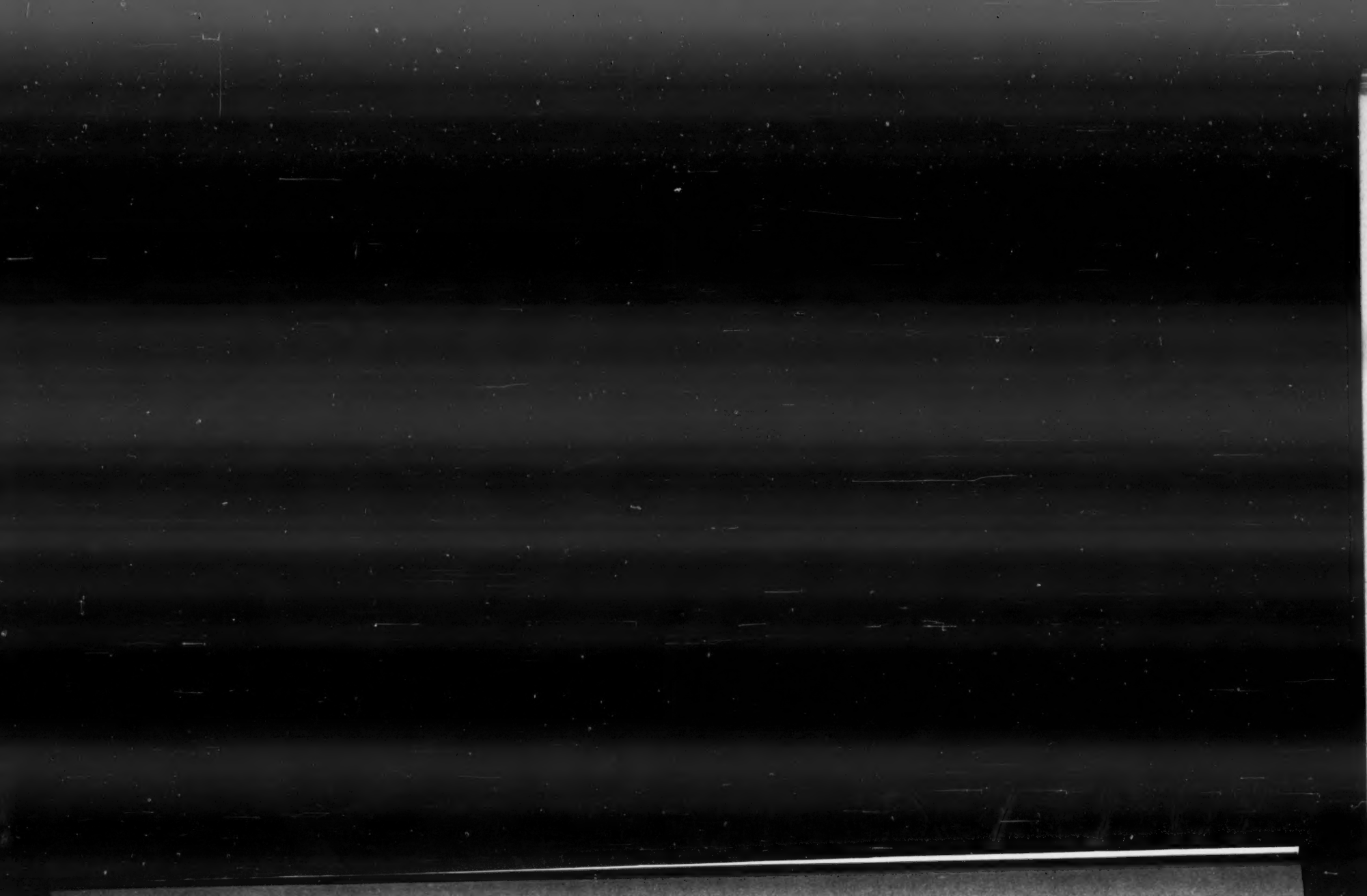

The Study of Fatigue[1]

By Charles S. Myers, C.B.E., M.D., Sc.D., F.R.S., *Director of the National Institute of Industrial Psychology of Great Britain*

Industrial fatigue is hard to measure. The typical laboratory tests fail to record a worker's real efficiency and recourse must be had to an analysis of curves of actual output, obtained under varying but carefully observed conditions. Thus, experiments on the introduction of twenty-minute rest pauses in a boot factory showed an average increased output of 44 per cent. These and other recent investigations of the Industrial Fatigue Research Board, as well as of the National Insitute of Industrial Psychology, are admirably summarized and weighed by the author, who brings to his task a medical background as well as a rich experience of research in both the laboratory and the shop.

IN APPROACHING the subject of industrial fatigue, it will be well first to summarise our knowledge of fatigue as derived from laboratory experiments.

THE NATURE OF FATIGUE

The muscle-nerve preparation served as the first instrument for inquiry into muscular fatigue. It has provided us with data which strongly suggest that each striated muscle fibre when stimulated responds by an all-or-none contraction; that is to say, if the stimulus is but sufficiently strong to produce a contraction, the muscle fibre contracts to the same extent, however strong be the stimulus. We have reason to believe that the muscle fibres while at rest secrete within them a store of material, in the form of glycogen, ready to break down, on or after the application of a suitable stimulus, into lactic acid, carbon dioxide, etc., a decomposition which is associated with contraction, the generation of heat and the production of electrical changes. It is conjectured that different muscle fibres within any one muscle show different degrees of irritability, so that while a weak stimulus is only able to affect a few muscle fibres, a strong stimulus will involve a larger number of fibres, the degree of contraction of the whole muscle thus being determined by the number of muscle-fibres which are at that moment in a state of contraction.

Study of the muscle-nerve preparation has further taught us that the response of the muscle-fibre is not

[1] Parts of this paper were delivered as a lecture to the Summer School of Columbia University, New York, in August, 1924.

only determined by the amount of stored material available but also by the rate of removal of the products of decomposition of that material. To these two factors—loss of explosive material and accumulation of its katabolic products—have been generally attributed the phenomena of muscular fatigue, i.e., the loss of response to stimulation consequent on repeated muscular exercise.

The muscle-nerve preparation also indicated that the end plate—the structure in which the nerve-fibre terminates at the muscle-fibre—is more readily fatigued than the muscle-fibre itself, blocking the transmission of the impulse from nerve to muscle at a time when the muscle-fibre is still responsive to a stimulus applied to it directly.

The importance of inhibition

Then came experiments on the intact organism by means of the ergograph, an instrument ideally recording the voluntary contractions of a single muscle—a series of flexor movements at a single knuckle joint, involving the lift of usually a relatively heavy weight. In these conditions fatigue appeared to be largely due to inhibitory nervous impulses ascending from the muscle to the central nervous system, and making it more and more difficult for impulses to descend to that muscle which would otherwise throw it into contraction. Some of these ascending impulses from the exercised muscle effect consciousness in the form of discomfort, pain or cramp, but others act purely reflexly, blocking the path of outgoing impulses, thus inhibiting voluntary movement. Hence when volition is powerless to evoke further ergographic records, they may still be obtained by stimuli applied on the skin surface to the motor nerve running within the limb to supply the muscle whose contraction is being studied.

The importance of nervous inhibition in safeguarding our striated muscular system from exhaustion is also seen in certain conditions of general fatigue or in certain stages of the influence of alcohol. The higher nervous levels appear normally to exercise an inhibitory influence over the lower, which may disappear in fatigue and under the influence of alcohol. Such loss of higher control may manifest itself temporarily in an increase in the amount of muscular work performed. Hence higher fatigue does not necessarily imply immediate reduction of muscular work, although it involves all the consequences of lessened control—first, loss of that delicate coördination of movement associated with the higher nervous levels, and second, extravagant expenditure of muscular energy.

Ergographic and muscle-nerve experiments also indicated the importance of rest pauses in relation to recovery from the effects of muscular exercise, a far greater total amount of work being elicitable when more frequent rests were introduced.

The work curve

Next came laboratory experiments into mental fatigue, which consisted essentially in the study of curves of output recorded minute by minute,

or five minutes by five minutes, during an hour or more's mental work. This work was of a simple uniform character, e.g. adding pairs of figures, or erasing a prescribed letter throughout a printed text. Here, again, the value of rest pauses on subsequent output was demonstrated, and attempts were made to determine the most favorable length of rest pause for a given period of mental work. But the chief value of such experiments lay in the analysis of the work curve, which brought to light the play not only of practice and fatigue, not only, that is to say, of the acquisition of skill and of the loss of efficiency produced by exercise, but of (a) incitement, the warming up of the subject to his work after he had been withdrawn from it, (*b*) settlement, the neglect of distracting conditions—and (*c*) spurts, of which the most striking are the initial spurt when the subject starts fresh to his work, and the end spurt when he realizes that the end of his work is approaching.

FACTORY FATIGUE

Valuable as have been the results of these laboratory experiments, they have proved far from adequate in their practical application. The conditions of laboratory experimentation are widely removed from those of work-a-day life. Muscular fatigue cannot be isolated in the factory, as in the laboratory, from such influences as skill and intelligence which depend on the proper functioning of the highest levels of the central nervous system. The most unskilled labour is really skilled, in the sense that there are good and bad methods of carrying it out. Further, a worker's movements cannot be compared with the movements of the subject of an ergographic experiment who lifts his finger repeatedly and rhythmically with the utmost force and to its utmost extent until he can move it no longer. The worker knows better than to exhaust himself in a relatively brief period by employing his utmost energy; he regulates his output according to his feelings of fatigue and according to the length of the period over which he has to work.

Variations of output

Thus it comes about that, whereas in laboratory research feelings of fatigue are not incompatible with a temporarily increased output of work, owing to the removal of normal inhibitory influence, in everyday life, as Muscio's experiments[2] have indicated, such feelings are more closely related to the varying output throughout the day. Moreover, as he has also shown,[3] even when no work has been done, a worker's efficiency, as demonstrated by interpolated tests, varies at different hours, the efficiency curve in a resting worker being similar in form to that revealed by actual work throughout the day but at a higher level.

Adaptations to length of day

The adaptation of the worker to the length of the working day has

[2] Brit. Jour. Psychol., 1921, vol. xii, pt. 2, pp. 150–162.

[3] Ibid., 1920, vol. x, pt. 4, pp. 327–344.

been well demonstrated by Vernon[4] in his observations on the effects of changes in the length of the working hours. An improvement in rate of output almost invariably results from shortening the working day; but generally it does not occur immediately, or at all events it does not attain its maximal effect immediately. Weeks or even months may elapse before the full beneficial effect of the reduction of hours on rate of output is reached. The output continues slowly to rise for a period varying, apparently, with the kind of work involved, and varying no doubt with the worker, until uniformity is again established. This can hardly bear any other interpretation than that the worker consciously or unconsciously adapts himself to the length of his day's work or of his work spell or shift. Hence, when that length is suddenly shortened, some considerable time is needed, during which he changes his rate of output, before he can adapt himself completely to the new conditions of work.

There is no doubt a complexity of other factors determining this change in rate of output. Thus, the worker's output is consciously or unconsciously influenced by that of his fellows and by the tradition of the factory. For this reason, the speed and extent of improvement in rate of output in a shop must depend on those who initiate it. By force of suggestion if they are workers who have prestige among their fellows their action will be more or less unconsciously imitated, whereas workers of inferior standing will arouse resistance rather than coöperation. But, apart from such complicating factors, the broad conclusion we are justified in reaching is that more or less unconsciously the industrial worker regulates his rate of output, according to the length of his working spell or day.

In this connection, it is interesting to observe that whereas adaptation to shortened periods of work is slow, adaptation to lengthened periods is quick. Thus, in the case of mill men engaged in the tinplate industry, while it took eight to ten weeks to reach the maximum of output after a change from an eight-hour to a six-hour shift; on reversion to the eight-hour shift the output fell at once approximately to its previous level without any appreciable period of adaptation.

But apart from the fact that the worker does not, like the ergographic experimenter, continually put forth his utmost power, he differs further in the fact that he is not always using the same joint or the same muscle. He varies his posture as he begins to feel discomfort, now using one set of muscles, now using another, for the same work, so that the previously used set may regain their freshness. Moreover, he is not contracting his muscles against so heavy a weight that in a relatively small number of lifts it is likely to produce complete impotence to execute further contractions.

Monotonous work

Similar objections hold in the case of laboratory experiments in mental

[4] Indust. Fatigue Res. Board, Report No. 6.

work, where, again, the subject is working his very hardest for a relatively short period of time, and the work performed is of the most uniform monotonous character, so uniform, indeed, that after a little practice, it is at times carried on quite unconsciously. If monotonous work in industry can be called—as I think it should be called—mental work, then the laboratory experiments are to that extent comparable with the monotonous conditions of industrial life. But they are clearly incapable of throwing much light on fatigue in work which demands the continual conscious exercise of intelligence.

ADAPTATION

This brings me to a further difficulty, depending not on the inapplicability of laboratory experiments to industrial conditions, but on the incompleteness of our knowledge of fatigue derived from experiment itself. It is impossible to believe that in such experiments as I have described we have the whole story of fatigue.

No doubt, in ergographic and in heavy muscular industrial work, pain or discomfort are largely instrumental in inhibiting further activity. But these are protective only. If they be disregarded, or if such feelings become blunted, further activity is possible. Moreover, increased interest, excitement, the influence of emotion or suggestion, may, as is well known, either prevent fatigue from manifesting itself or lead to a revival of muscular or mental activity. Let us endeavor to form some idea of how this occurs.

Muscular contractions, and acts of apprehension, decision and the like are one thing. They may perhaps be regarded as explosive acts fired off much as a heat spot fires off, so to speak, its sensation, and then requires rest for recovery. But these contractions and acts occur in a setting of tone, posture, and attitude, perhaps much as the heat and cold sensations appear to occur in a setting of sensibility to warmth and coolness. The muscular contractions and mental acts are of an intenser, more momentary character, readily susceptible of fatigue, whereas muscular tone and posture, and mental attitudes are of a milder, more prolonged character, far more resistant to fatigue.

Sources of fatigue in mental work

We can endure the light of a northern summer for hours without fatigue: adaptation appears to enter in its stead. We can maintain a given posture likewise for a prolonged period: adaptation appears to step in, coördinating activity within pairs of antagonistic muscles, and perhaps setting up some "give and take" between them. It is this process of adaptation which finally tires. In mental work it is the ability to preserve the right attitude that finally tires, then making further mental work disorderly and useless. Of this kind of fatigue we know practically nothing. When we are engaged on a given piece of mental work—let us include even the repeated addition of pairs of figures and muscular work, for even this, I would insist, involves mental work—all conflicting nervous impulses must be inhibited, other

distracting ideas and other muscular movements must be suppressed in so far as they are incompatible with the work at hand. Such inhibition in itself involves work. I know of no physiological evidence to support McDougall's view that inhibition is merely the result of the drainage of energy into other channels which are simultaneously active. The suppression of conflicting emotional states in psycho-neurotic conditions affords an adequate example of how active a process inhibition is. But this inhibition of incompatible attitudes though it may last a long time, cannot continue for ever. It becomes more difficult, partly perhaps through nervous blocking, partly because the inhibited or repressed attitudes and acts gain in strength and finally insist on manifesting themselves by bursting through the restraint imposed upon them.

Boredom and fatigue

We thus gain some idea of the place of boredom in our conception of fatigue. An attitude may be maintained, at first, by interest, the work being intrinsically and spontaneously attractive. Later, volitional acts have to be employed to maintain this attitude, and as these become more difficult and more ineffective, the feeling of interest gives place to one of increasing boredom.

It is naturally the most delicate and latest acquired functions that suffer most in mental fatigue. In the work of adding pairs of figures, it is not so much the speed or accuracy of the reaction to 2 + 1 that becomes impaired as the ability to attend to and to apprehend the meaning of this presentation. Reaction times are in themselves poor indices of fatigue. What suffers is the inability to preserve the proper attitude.

The more intelligent the worker the more irksome becomes monotonous work, the more difficult becomes the maintenance of the required attitude, because of the demands of his intellectual processes. An interesting illustration of this is afforded by a recent investigation by Miss I. Burnett[5] who in a laboratory experiment engaged four unemployed work girls in the daily repetitive work of cross-stitching throughout two months. Of these four girls, two had been rated by an intelligence test as highly intelligent, the third showed average intelligence and the fourth was distinctly below average in intelligence. Each of the first two girls showed distinct signs of boredom in the work; the one was restless and yawned, seizing every opportunity for change of posture and engaging far more often than the others in conversation, while the other confessed that she found the work "very tedious and would not like to do it regularly." These two most intelligent girls "were capable of reaching a high output from time to time but were unable to maintain it." The worker who was rated third in intelligence did by far the best work, 12 and 16 per cent respectively more than the two girls who were rated highest in intelligence. She declared at the end of the experiment that "so far from

[5] Jour. Nat. Inst. Indust. Psychol., 1924, vol. ii, no. 1, pp. 18–23.

experiencing any strain of monotony as a result of the repetitive work, she had rather liked it." Her regularity of output, too, was far greater than that of any of the other girls, 14 and 25 per cent greater than the two most intelligent, and 22 per cent greater than the least intelligent. The latter showed very considerable improvement with practice but made a very bad start and appeared hampered by clumsiness, holding the needle with difficulty, and picking it up with difficulty from the floor on to which she frequently dropped it. She offered no objection to the repetitive work, but complained of the occasional conversation of the other girls.

The practical outcome of these experiments is that monotonous work requires a certain degree of intelligence, but that it suffers appreciably if too great intelligence be brought to bear on it. Such ill effects may be safeguarded, as we shall see, by rest pauses and by changes of work. They may also be prevented by recourse to day-dreaming and in certain circumstances, especially when the work is rhythmical, by refuge in song.

Effects of varying work

In some laboratory experiments on the effects of varying work, carried out by Wyatt[6] on three young adults during two daily spells of 2½ hours each, lasting over six weeks, the output increased by amounts varying from 2.4 to 24.2 per cent. The errors decreased by amounts varying from 9.2 to 55.1 per cent (according to the subject and the work), when the nature of the work was changed at about fifty-minute intervals. The work was of three kinds—adding in the head sets of 5 digits, adding, by means of a comptometer, columns of 10 digits, and pulling every half-minute against a powerful spring balance with the right and left hands alternately. During three of every four days one or other of the three tests was worked continuously. On the fourth day each spell was divided into three periods of fifty minutes, and the three tests were consecutively given during the three periods. The results, as I have said, varied according to the worker and his liking for the work performed.

On the other hand, too many changes of work must obviously have a deleterious effect on output. In a manufacturing chemist's work, an increase of from 17 to 20 per cent in wages earned was found by Wyatt[7] to occur when the operative changed approximately every half-hour from one process to another instead of, as before, carrying out from 100 to 250 different changes of process in the course of the day, giving an average duration of from two to five minutes for each process.

Rhythm

Closely allied to preservation of the right attitude and posture is preservation of the proper rhythm and of due coördination of the various movements that make up an operation. Just as the members of

[6] Indust. Fatigue Res. Board, Report No. 26.

[7] Ibid.

a boating eight become "ragged" in fatigue, using useless energy with relatively useless results, so the tired worker "falls to pieces;" his rhythm and skill suffer.

In the operation of roughing, i.e., removing scratches and imperfections from spoons and forks, which are pressed for the purpose against a rotating wooden leather-covered wheel, oily sand being allowed to fall between the wheel and the article that is being roughed. Farmer and Brooke[8] estimated by means of a recording watt meter, the number and duration of strokes, the pauses between the strokes and the pressure of the strokes against the wheel, as the output fell off from fatigue. They found that the number of strokes per spoon, the duration of those strokes, and the pressure with which the strokes are applied increased towards the end of the spell in spite of the fact that, at this time, when output is actually diminishing, fatigue may be supposed to be present. As they express it, the tired worker is "not only working slower than when she is fresh but is expending her energy extravagantly."

The number of strokes per spoon remains nearly constant during the morning; which is a fair indication of the maintenance of a steady rhythm. It is during the afternoon, especially towards the end, that the greatest variations occur. Just as when interest fails, constant volitional efforts have to be employed to maintain the requisite mental attitude, so when the natural rhythm fails through fatigue, conscious efforts have to be invoked to carry on the work.

[8] Ibid., Report No. 15.

It is in this sense that I ally rhythm with muscular posture and mental attitude. All three can be prolonged for some considerable time before fatigue sets in. All three may be regarded as a kind of matrix in which mental and muscular acts are set. All three require for their maintenance a directive activity which ultimately tires—an activity of the nature of which we know no more than we do of that directive activity of which it is an expression—that activity which *par excellence* distinguishes animate from inanimate nature.

Abnormal fatigue

Fatigue, in the sense of a diminution of efficiency owing to prolonged exercise, is of course a normal and healthy result of all work; it can only be considered serious and abnormal when after the rest which follows any given spell of work, it is not almost wholly dissipated. For then, spell by spell, day by day, the fatigue effects accumulate and the time must sooner or later arrive when healthy fatigue is replaced by pathological exhaustion.

Taking the daily industrial work curve and comparing it throughout the week, we actually find evidence sometimes of such accumulation of fatigue, but in general, it is practically dissipated by the week-end rest.

The amount of fatigue during the week varies with the skill of the worker. In the boot and shoe industry, for example, the most expert operative's record was found to rise throughout the week, whereas in some instances the poorer worker's began to

fall from Wednesday or even earlier onwards.[9]

The influence of fatigue may be masked by spurts. Thus in silk weaving the best output occurs between Thursday morning and Friday noon, which is the "making-up time" for calculating the wages to be paid on the week's work. The approach of an annual holiday when the maximal piece-rate earnings are coveted, may lead to a similar spurt.

LENGTH AND DISTRIBUTION OF PERIODS OF WORK AND REST

The earliest attempts in Great Britain to deal systematically with the problems of industrial psychology which arose during the recent war were made by the Health of Munition Workers Committee. They concerned the proper length and distribution of periods of work and rest. There were times during the war when in Great Britain munition workers worked nominally for 74½, actually for about 66 hours a week. In one case, for example, 63½ hours were actually worked by women engaged in the moderately heavy work of turning fuse bodies. When their weekly hours of actual work were reduced from 63½ to 47½, their total weekly output rose by 13 per cent. An even greater increase in weekly output, an increase of 19 per cent followed the reduction of hours actually worked from 58.2 to 50.4 per week in the case of men engaged in the heavier work of sizing fuse bodies. Not only was the output thus increased, but a reduction in the amount of lost time through sickness, slackness, etc., also resulted. Thus in a shell factory the time lost fell from 11.8 to 6 per cent after the hours of work had been reduced from 63¼ to 54 per week; while later in the iron and steel industry a reduction of the hours of work from 53 to 48 per week was followed by a reduction in lost time from 2.46 to 0.46 per cent of the working hours.

Working hours in munitions and glass works

But although the total weekly hours now worked in Great Britain do not generally endanger serious fatigue, we are nevertheless confronted with the important problem of the best distribution of those hours so as to secure the *maximal efficiency* (which includes the maximal health and contentment) of the worker. During the war a comparison was made by the Industrial Fatigue Research Board[10] between the output during twelve-hour and eight-hour shifts among women workers who were engaged in cutting off the ends of the roughly forged shells. It was found that that part of the work which was dependent on the worker and independent of machinery, and which was performed in 100 minutes of the long-shift system was accomplished in 80½ minutes when the short-shift system was adopted. That means a 19.5 per cent improvement. Vernon[11] has since studied the output records of four British

[9] Ibid., Report No. 10.

[10] Ibid., Report No. 2.

[11] Ibid., Report No. 1.

factories in the tinplate industry. The hourly output during four-hour shifts was found to be 11.5 per cent greater than when eight-hour shifts were worked. Moreover, under this shorter-shift system the output no longer showed the serious fall at the end of each day, which occurred in the longer-shift system. Finally the amount of lost time was less.

In certain glass works in Great Britain Farmer[12] recently found that the hourly output increased by about 10 per cent when eight-hour shifts were substituted for ten-hour shifts. There was also an appreciable reduction in spoilt work and decrease in lost time when the shorter shifts were introduced. The increase in rate of output in the eight-hour shift was not in itself large enough to make the output equal to that in the ten-hour shift, but as the eight-hour shifts allowed of a twenty-four-hour use of the plant, the total daily output was higher than when the ten-hour shifts were employed, which involved only a twenty-hour use of the plant daily.

Length of rest pause

The most favorable *length of the rest pause*, and the most favorable point of its introduction can only be determined by careful expert analysis of the work curve. As the laboratory work of the Kräpelin school has shown, they vary with the worker, with the nature of his work and with the duration of its spell. In a boot and shoe factory[13] it was desired to increase the output without adding new machinery. This was effected by allotting to each double press three, instead of the usual two, girls; each of the three working for forty minutes in each hour, and resting the remaining twenty minutes. An increase of output was obtained in the six presses worked, amounting to 45, 43, 57, 39, 43 and 75 per cent respectively, the average increase of output for the six presses being over 44 per cent. The presses showing the highest increase were those worked by the least skilled operatives, in whom fatigue was doubtless most prevalent. Lost time and sickness were diminished, and a spare girl was always at hand in emergency to take the place of an absent member of the team.

Time required for improvement of output

Save in exceptional circumstances, however, the introduction of such lengthy periods of rest must prove impossible. On the other hand, the value of shorter rest pauses has been repeatedly demonstrated.

Vernon[14] has brought forward evidence to show that several months may be needed before the full effect of rest pauses may be reached. Thus in an experiment on girls making bicycle chains, it took six months. In one on labelling, it took ten weeks. Vernon has here again shown that rest pauses produce their maximal effect on the slowest workers. Thus when girls engaged on labelling were divided into three groups according to their speed of work, a ten minutes'

[12] Ibid., Report No. 24.
[13] Ibid., Report No. 10.
[14] Ibid., Report No. 25.

rest effected an improvement of 8 per cent in the quickest third, one of 17 per cent in the slowest third, and one of 13 per cent in the middle third.

Breaking long work periods

There can be no doubt that in by far the majority of operations, the efficiency of a spell of work exceeding four hours can be improved if divided into two halves separated by a few minutes' pause. Again and again, workers have testified to their appreciation of such a rest interval. The work curve is thereby not only raised in height but is also improved in form. We shall presently have occasion to examine the various forms of work curve. At the moment I wish to indicate by actual example, from an investigation at the National Institute of Industrial Psychology,[15] how a daily work curve may be improved in form. In the following instance, before the rest pause was introduced, the work curve, averaged from a number of workers, showing the output for each half-hour throughout the day, rose until 9:30 a.m., remaining at the same level until 11:00 a.m., then declining, next rising from 12:00 to 12:30 probably through the influence of end-spurt, and finally falling slightly until 1:00 p.m. when there was an hour's break for dinner. After a rest pause of seven minutes had been introduced at 11:00 a.m., not only was the curve throughout at a higher level, but the level was much more uniform than in the previous curve, indicating perhaps a lessened call on excessive voluntary effort, and more orderly, rhythmical method of work. In the afternoon work curve, under both conditions a spurt occurs at 4:30; but where the rest pause was introduced (at 4:00 p.m.) the improvement was maintained and the curve continued to rise right up to 6:00 p.m., the end of the day's work, whereas, before the introduction of the rest pause it fell during the last half-hour. When no rest pause was interpolated at 4:00 p.m., the work curve fell sharply from 4:00 to 4:30; but after the seven minutes' rest had been introduced at 4:00 p.m., the work done during the remaining twenty-three minutes of the half-hour actually exceeded that done in the same half-hour when no rest pause was interpolated. Despite a 3 per cent reduction in total working hours due to the pause, a more than 5 per cent increase in output, with less fatigue to the worker, resulted. The workers greatly appreciated the pause.

In another experiment[16] an increase of over 14 per cent in output was obtained by the introduction of a fifteen minutes' interval in the morning and the afternoon, which the workers, engaged in another factory on the same work as that referred to, spent mainly in a *change of work*, not merely in rest. They spent the pause in collecting materials, a task which had been previously carried out partly during the first few minutes of each morning's work, partly distributed irregularly throughout the remainder of the day. The output

[15] Jour. Nat. Inst. Indust. Psychol., 1922, vol. i, no. 3, pp. 89–92.

[16] Ibid., 1923, vol. i, pt. 6, pp. 236–239.

curve showed an enormous improvement in form as well as in height. The workers were unanimous in their approval of the change.

Improvement before rest pause

That a rest pause may also show an improvement of output not only after but also before the pause is indicated by the following data obtained by Wyatt and Ogden[17] in a laboratory experiment consisting of adding series of 5 digits during morning and afternoon spells of work. The percentage increases of output owing to the rest pause were

	Morning	Afternoon
Before the pause.....	12.1	19.8
After the pause.....	20.5	24.1

INTERPRETATION OF WORK CURVES

A well-shaped curve should not show too many irregularities, for these indicate the excessive play of voluntary effort and inadequate help from habit and rhythm. It should not decline too greatly towards the end of the spell or work, for this indicates excessive fatigue. Irregularities, initial rises and final falls there must always be; an absolutely flat curve is unobtainable. End-spurts may or may not be present, but they are so variable in occurrence that they cannot in general be considered as diagnostic of a good or bad form of work curve.

Farmer[18] has recently attempted to indicate the conclusions which may be drawn from changes in the shape and level of the work curve due to a change of conditions. First, the curve may remain the same in shape but be on a higher level. This he regards as signifying that a greater output has been obtained under the new conditions with the same amount of effort, and with the same fatigue effect of the day's work. Second, the curve may keep practically on the same level but now be of a far better shape. We may then infer that the operation has been facilitated by the changed conditions in the sense not that it can be performed with greater speed, but that the cumulative effects of its repetition are less fatiguing than in the original method. Third, the curve may be on a higher level but of a worse shape. Here we may assume that the increased output has resulted from a quicker and more fatiguing method of working, such as may be expected when methods of speeding up are introduced with little regard to the health of the worker. Lastly, the curve may be on a higher level and also of a better shape. When this occurs, we are no doubt justified in considering that it indicates an easier, speedier and less fatiguing method of working, yielding a higher output with less fatigue to the worker, despite the fact that he is repeating the operation a larger number of times during the day.

Variations due to individual reaction and type of work

But it must be remembered that, under otherwise similar conditions, the ideal work curve cannot be realized for *every* worker and for

[17] Indust. Fatigue Res. Board, Report No. 25.

[18] Brit. Jour. Psychol., 1923, vol. xiii, pt. 3, pp. 308–314.

every type of work. Some individuals work better in short stages and by spurts, others over longer periods and more uniformly. The rest pauses which increase the output of some workers will, as has been shown by research in this country, reduce the output of others. Moreover, some types of work are characterized by considerable muscular fatigue. In these the work curve must be expected to fall considerably towards the end of the morning's work, to show a fair recovery after the mid-day break, followed by a progressive, well-marked fall throughout the afternoon. On the other hand, operations requiring skill and dexterity would be expected to show a work curve rising slowly in the morning to a maximal peak, as the worker settles to his work, followed by a less obvious fall (adaptation preventing or outweighing fatigue), a less complete recovery after the mid-day break (owing to loss of adaptation), and a smaller decline towards the end of the afternoon. Again, the work curve of operations characterized by rhythmical movements may be expected to show a good increase during the morning as the worker settles down to his rhythm, after which the output is relatively well-maintained throughout the rest of the day, provided that the hours of work be not excessive.

All these expectations have been verified in an inquiry conducted on behalf of the United States Public Health Service.[19] The stability of output occurring in the case of rhythmical work was found to be still greater in machine work, a steady rise occurring up to the third or fourth hour of the day, after which there was little variation in the rate of production. But, as would be expected, these curves varied in shape according as they were obtained from an 8-hour plant or a 10-hour plant, those from the latter showing a slower rise in the morning, and an earlier and greater fall throughout the afternoon.

[19] U. S. Pub. Health Service, 1920, Bulletin No. 106.

Characteristic curve for monotonous work

Attempts have been recently made to claim that a special form of curve is apt to appear in monotonous work,[20] the worker coming fresh to it at the start of the spell, then becoming bored with it and finally looking eagerly to its termination as the end of the spell draws near. The curve of monotonous work, if this claim be substantiated, falls in the middle of the spell and is higher on either side of it—thus being absolutely inverse in shape to the "normal" work curve which reaches its maximum not far from the middle from the spell of work.

Effects of working conditions

Lastly I must draw attention, however briefly, to the importance of such influences as lighting, humidity and temperature upon output.

The work of Wyatt, Weston and Elton[21] has shown that in the proc-

[20] Jour. Nat. Inst. Indust. Psychol., 1924, vol. ii, pt. 1, pp. 18–23.

[21] Indust. Fatigue Res. Board, Reports Nos. 9, 20, 23.

ess of cotton-weaving the use of artificial light reduces output by 5 per cent, and that in the more delicate processes of silk and fine-linen weaving it reduces output by 10 and 11 per cent respectively.

In fine-linen and in cotton-weaving, Weston and Wyatt[22] have shown that owing to the discomfort and fatigue of the weavers, efficiency falls when the wet-bulb temperature rises beyond about 73°F., despite the fact that a higher temperature and a higher degree of humidity are favorable from the point of view of their physical effects on the manufacture of the material.

The effects of temperature on output are indicated by the data of seasonal variations obtained by Vernon in the iron and steel industry and by Farmer, Brooke and Chambers in the glass industry.[23]

THE COMPLEX CHARACTER OF FATIGUE

I have said enough to indicate the impossibility of defining fatigue in a way satisfactorily for the application of any tests devised to measure it. The interpolation of a test inevitably introduces a change of attitude and a change of interest or the complication of some other feeling. The subject may be gratified, be annoyed, or, as is sometimes the case, apathetic, at being called away from his daily work to the test. He may be amused or alarmed at the apparatus which is applied to him or remain completely passive. Also, he may become bored with the test to which he is repeatedly submitted. Such influences, varying at different times and in different persons, cannot fail to affect the results of a test even when it is of such a character that the worker cannot voluntarily control his behavior to it, as is the case, for instance, in measuring cardiac, vascular, or respiratory activity. If, on the other hand, the test be opened to the voluntary control of the subject, e.g. a dynamometer test or a test of adding figures, dotting circles, or erasing a prescribed letter from printed matter, we are dependent almost entirely on the conscientiousness of the subject for our belief that he is always doing his best at the test.

If we continue to use (and it is almost impossible to avoid using) the term fatigue in industrial conditions, let us remember how complex is its character, how ignorant we are of its full nature, and how impossible it is in the intact organism to distinguish lower from higher fatigue, to separate the fatigue of explosive acts from the fatigue of maintaining attitudes, or to eliminate the effects of changing interest, excitement, suggestion, and the like. In industrial psychology, our hope lies rather in the study not of fatigue tests but of the curves of actual output, endeavoring to analyse the various influences at work and to observe, by the comparison of curves obtained under different conditions, how industrial efficiency may be improved.

[22] Ibid., Reports Nos. 20, 23.
[23] Ibid., Reports Nos. 1, 5, 24.

Pooling Operating Personnel

By F. J. Hughes, *United States Department of Agriculture*

The economical administration of clerical personnel in large organizations presents practical problems which are somewhat the same whether the organization be a government bureau, a clearing house or a sales department. The clerical pool as described by Mr. Hughes is no novelty, either in business or government offices; but its effective use is not as general as it would be if the precautions which the author insists upon were kept in mind.

I. A CLERICAL POOL

EARLY in 1919 the demand for general clerical assistance for short periods in emergency assignments became a real factor in our personnel problem. Several of our divisions expanding at this time required assistance of this type, and yet their funds were not such that they could take on permanent employees. To meet this situation a clerical pool was established, from which the various divisions of the Bureau might secure assistance for short time assignments in typing, checking records, addressing envelopes, miscellaneous copying, semi-statistical work, and other general clerical work. The Bureau Administrative Office set aside ten statutory $1000 places, for which we secured ten clerks to handle calls of this character, with the following limitations: That no assignment would be made for a period of longer than thirty days without special arrangement; that any division that utilized the services of clerks from this pool for an aggregate of more than six months out of a calendar year would be required to increase its permanent force, or rearrange its work so as to reduce the calls of this character. It was early found that some divisions attempted to use this means to increase their clerical force because the cost of this help did not come directly from their appropriation. However, this practice has been practically eliminated.

It is the policy of the Bureau to fill vacancies in permanent clerical assignments from the personnel of this pool where a suitable employee can be secured from that organization. It is not infrequent for a division when a vacancy in a permanent assignment occurs to request that one of the employees in the pool, who has been assigned to that division for emergency work, be permanently transferred to to fill the existing vacancy, as this person has been tried out and her ability is fairly well known in advance. Assignments within the divisions re-

quiring specialized training which the personnel of the pool cannot meet, of course, are filled by direct appointment from Civil Service registers or through other channels. The average employee remains in the pool less than six months.

The maintenance of this pool has enabled us to accomplish several things. (1) To expedite the handling of emergency work, as under the regular procedure it takes several days to secure a temporary appointee from the Civil Service registers, consummate appointment, and complete arrangements for reporting for duty. (2) It enables the Bureau to take more time in selecting employees and thus frequently to secure a more satisfactory employee for the vacancy involved than would be possible were it necessary to rush through a temporary appointment to handle a piece of work in an emergency. (3) It gives the Bureau the advantage of the training secured by these employees while engaged on temporary and emergency assignments. (4) It affords excellent opportunity to observe these employees before giving them permanent assignments, and determine just what phase of work they appear to be best fitted for, as their assignments take them to practically every branch of our organization in Washington.

Practically 90 per cent of the employees in the Clerical Pool since its operation have been specifically requisitioned for some position within the various divisions because of their demonstrated fitness therefor.

This unit is also utilized to temporarily handle cases of clerical employees who, for some reason or other, at times develop into misfits in their particular assignments, and for personal reasons so well known to employment managers, it becomes impracticable to retain them as members of a particular unit. Because of their satisfactory service record it is felt that disciplinary measures are not desirable, and in these cases, the employees are temporarily transferred to the pool until satisfactory assignments develop in which their services can be utilized advantageously.

It is the policy of the Bureau to limit the salary for these employees, and they understand that their promotion beyond a certain salary and grade will not be considered until they secure a permanent assignment in the Bureau organization.

The pool was established as an experiment and has proved to be very satisfactory.

II. A STENOGRAPHIC SECTION

When the Bureau of Markets was originally established in 1913, details for the establishment of a Stenographic Section, which has proved to be a very satisfactory operating arrangement, were worked out.

It was determined that the Stenographic Section should supply stenographers to handle all general stenoraphic work in the Bureau with the exception of those individuals—division chiefs, etc.—who had continuous need of a stenographer and secretary; that its best economic function would be to serve those dictators who had not such continuous need, and to act as an auxiliary for those who had, and for the Bureau as a whole. It was to be, in short, a service station for all

those who had need of stenographic help daily or occasionally; a reservoir to draw upon for emergency work, mass or otherwise; an auxiliary for those whose personal stenographers were overloaded or absent, and it was to furnish stenographic, typing and secretarial service for consulting experts who are called in from time to time. It was felt that such a mobile force of stenographers, from the character of the organization and methods of functioning, would be able to effect good service at a distinct monetary saving.

In all cases the correspondents in the division would call upon the head stenographer for the assignment of stenographers; these stenographers having taken the dictation, would return to the stenographic section to transcribe the material. The finished work would be returned to the dictators' desks by messenger. A method of record keeping was devised, which comprises a permanent history of the actual work performed by each individual member for each day. This is the procedure still in vogue in the Bureau of Agricultural Economics of which the former Bureau of Markets is a part.

The Stenographic Section at present includes:

1 head stenographer
1 reporting stenographer
1 assistant to the head stenographer, who gives particular attention to the handling of intricate tabular matter
10 stenographers, who are available for assignment to all dictators whose material is difficult to handle because of rapid dictation or of the technical nature of the subject matter involved
3 stenographers, who handle the less rapid and involved dictation
1 messenger boy

To this section is also referred manuscript material for copying. This is done by the stenographers in their spare time and when they are not engaged in the actual taking of dictation and transcribing same. We now have this section operating with a minimum amount of time unused, this period amounting to only 12 per cent of the time of one employee per month.

The section has functioned in a very satisfactory manner. We point out clearly to candidates for employment in this unit the nature of the work, and the fact that they are working in a pool organization and that "service" is a fundamental factor.

The assignment of stenographers is left entirely to the Head Stenographer, and no dictator is permitted to call for the assignment of any particular stenographer, this in fairness both to the stenographers and the dictators, insuring a rotation of service which permits the keeping up of a standard on the part of the stenographers, and the rendering of the same degree of service to the various dictators.

By this pool arrangement we feel that we have accomplished principally two things: (1) The securing of the best grade of stenographers for strictly stenographic work; (2) The handling of stenographic work by a highly trained corps of operators in a more efficient manner than it would be possible to handle this phase of work were a sufficient number of stenographers assigned throughout the divisions who would be employed only a part of the time each day in stenographic work.

The personal feature, of course, enters into this sort of arrangement and the efficiency of the operation of units of this kind is dependent in no small degree on the individual ability of the head stenographer, who should at all times keep in touch with the activities of the Bureau, and without comparison of permanent relative values, be able accurately to determine which particular piece of work is at the particular time under the spotlight.

I believe I am safe in saying that our divisions as a rule are very well satisfied with this service unit, and from an administrative standpoint we feel that it is the logical way to handle this phase of operating routine. The centralizing of the handling of stenographic work in the Bureau also insures uniformity as to style and form, which is so essential in a large organization.

As a result of a study of our organization, the General Land Office, Department of Interior, adopted the Stenographic Pool System several years ago, and I understand they are operating on about the same basis as we operate here, and that it is rendering satisfactory service.

A stenographic section is a recognized economic utility in business houses generally. In the Government service, and particularly in a scientific bureau, its success is absolutely dependent on the good will and cooperation of the users and the officers of the administration.

Service Shopping in Stores

By Julia Mockett, *Research Bureau for Retail Training, University of Pittsburgh*

The public wants better service from store employees. Systematized service shopping is one way of measuring the service actually rendered and of locating the spots where improvement is most needed. Miss Mockett tells what a store executive needs to know in order to use this device effectively in the development of store personnel.

SERVICE shopping is a valuable method of investigating various types of service a store renders to the public. We are particularly interested in ways of measuring the service which the public receives in retail department stores. When we speak of service shopping in a particular store, we mean shopping in the various departments in order to get a check on the service given to customers. Service shopping is not to be confused with price shopping or comparative shopping, by which we mean shopping to compare the merchandise values of one store with those of another.

WHAT TO LOOK FOR IN SERVICE SHOPPING

Service shopping in some form is now being used in almost every large store. It is usually done to check up the general conditions in the store, to see wherein they can be improved, and to learn how the store can help its people by training them to become more expert in rendering service to customers. It may be used as a barometer to gauge the betterment of service from year to year, to find out exactly why salespeople are not making good, to discover the type of merchandise instruction they need, to check the accuracy of statements made in advertisements, or as a means of keeping the whole force "on its toes."

The following report forms used for shopping various types of service show the type of thing the customer is asked to notice and to record.

Selling Service Report

1. Did you regard the service as especially satisfactory, just medium, or poor?
2. Were you approached promptly?
3. Did you feel that the salesperson was interested in you throughout the sale, even though you did not buy?
4. Was he courteous?
5. Did he suggest merchandise other than what you asked for?
6. Did you feel that the salesperson was intelligent?
7. Was his language pleasing and businesslike?
8. Did he know his stock?
9. Would you make it a point to return to the salesperson? Or, would you avoid the salesperson? Or are you absolutely indifferent to the salesperson?

10. What impressed you about the salesperson or the department as especially pleasing or attractive? As displeasing or unattractive?
11. Tell the story of what occurred during this transaction.

Inspecting—Wrapping—Cashiering Report

1. Did you feel that you received reasonably rapid service?
2. Did you consider the service courteous?
3. Were you given a salescheck or cash register receipt?
4. Was the merchandise wrapped satisfactorily for carrying? How might it have been wrapped more conveniently?
5. Was the change counted back to you?
6. After the sale was made, how long did it take to get the purchase back wrapped?

If it was a *charge* transaction, answer the following:

7. What was the amount of purchase?
8. How long did it take to get the purchase back wrapped?
9. Was coin used?

Delivery Service Report

1. Did the purchase reach you at the time promised?
2. Did you see the delivery man? If so, was he courteous?
   If not, specify his discourtesies.
3. What did he do that pleased you?
4. Were packages in good condition?
5. What do you recommend in regard to the delivery of merchandise to make this service completely satisfactory?

Report on Returned Goods Service

Returns made in person:

1. Was the service courteous?
2. How long did it take to put the transaction through?
3. To how many people was it necessary to go in order to make the return?
4. Did you consider this service satisfactory?
5. Tell the story of what happened when you went into the store to return the merchandise.

Wagon Call:

1. Time call was sent in: Date, Day of week, Time of day.
2. Time the wagon came: Date, Day of week, Time of day.
3. Did you consider the service prompt?
4. Was it entirely satisfactory?
5. What suggestions would you make to the store for improving this service?

Telephone Service Report

1. Time to get the store: minutes, seconds. Did the store answer on the first ring?
2. Time to get the department: min., sec.
3. Time to get salesperson who could give information: min., sec.
4. Did you have to ask more than one person in the department for information?
5. Was the service in the department courteous?
6. Was the service in the department intelligent?
7. Would you consider the service on the whole exceptionally satisfactory, just medium, or poor?
8. If you considered the service inefficient, what was the reason?
9. Give verbatim account of the shopping stating what was asked for and the replies given.

Elevator Service Report

1. On what floor was the elevator entered?
2. Check if elevator was going up—— or down——?
3. Time required to get elevator: min., sec.
4. How many cars passed while you were waiting?
5. Was the appearance of the operator satisfactory?
6. Did he converse with other employees?
7. Did the operator impress you as being courteous?
   Were directions and answers to questions given in a pleasant manner?
8. Was his handling of the passengers efficient?
   Was the car overcrowded?
   Were passengers skipped when they might have been carried?

Did he announce the floors and departments?
Was the announcing distinct?
9. Was the operation of the car satisfactory?
Were safety precautions taken?
Was the car run smoothly?
Was the car stopped even with the floor on the first trial?
10. Was the elevator service on the whole satisfactory?
If not, how might it be improved?

Report on Advertised Merchandise

1. How many people did you ask before you located the merchandise?
2. Who were they?
3. Were you misdirected?
4. By whom?
5. Did salesperson know about the advertised article?
6. Did he give correct information about the article?
7. Did he give full information?
8. Tell the story of what happened when you went into the store to look for the advertised merchandise.

SERVICE SHOPPERS

What type of person can be used as a shopper, where can he be found, and can he be relied upon to give an unbiased opinion of the service he receives? These are some of the questions which confront a person who directs service shopping. Naturally, the type of person who shops regularly in a store is the best judge of the service there. In an exclusive shop, a discriminating person is the only one who can give in a helpful way his reactions to the treatment he received, or who can make any usable suggestions for improvement. In a large store which sells all classes of merchandise, a more cosmopolitan group of customers may be used.

It is necessary to select service shoppers with great care. A survey of this kind cannot be carried on successfully by professional shoppers because the salespeople soon recognize them. It is much better to choose people who have the customer's of view, and who are interested in the improvement of department stores. The best job is done by an enthusiastic open-eyed person who notices everything and who is willing to write down his experiences in a convincing way.

The larger percentage of a store's customers are women. It follows, then, that a shopping group should be comprised mainly of women, most of them of mature age, with a few younger ones, such as college seniors and secretaries, and also several men.

It is quite easy to get in touch with people who are interested in doing shopping of this kind from time to time. The personnel director of the store and his assistants usually have a group of friends whose judgment may be relied upon and who may be put on the list of available shoppers, and others may be reached through groups of college alumnae, churches, and Y. W. C. A.'s.

Let us suppose that Mrs. "A" has been selected for service shopping. Before she begins her shopping, she must be thoroughly acquainted with the questions which are to be answered in the report forms. By means of an interview with the person in charge of the service shopping she is told the type of thing to look for. She is told that the transaction must be natural but at the same time not too easy; that the store wants to

find out what kind of service is given to a customer who is exacting, not to one who pays no attention to the service; and that it is necessary to get the name of the salesperson shopped, in order to give him credit for the transaction. This of course is easy if she buys something, because the salesperson's number is on the salescheck or cash register receipt. But in case she has just looked at the merchandise she must be most tactful in getting the salesperson's name by asking such questions as: "If I decide to take this after thinking it over, could I telephone you?" or "If I bring my sister in to see it, for whom should I ask?"

In a department which carries inexpensive and smaller merchandise, such as Notions or Ribbons, it is rather awkward and unusual to get a person's name without buying, so the customer usually purchases a small article.

Since merchandise purchased is returned to stock and resold, the customer is asked to avoid buying remnants or having yard goods cut.

PURPOSES OF SERVICE SHOPPING

A store is always interested in finding out what its customers think of the service they receive. A manager cannot always know what the mass of people are thinking as they leave his store, but he can alter a bad situation if he does know about it. Shopping does not solve all service problems, but it provides the management with definite data as to what is going on in the store, and suggests the logical place to begin making improvements.

a. Shopping to measure improvement in service

Shopping has been especially useful in measuring the success of service campaigns. In order to judge the effectiveness of a campaign, the salespeople in representative departments are shopped several weeks beforehand, and a similar shopping is made several weeks afterward. The difference between the figures of the first and second shoppings is taken as a measure of the success of the campaign. The figures from a survey of one store, for instance, show 50 per cent of the transactions as satisfactory before the campaign, and 64 per cent as satisfactory afterward. This indicated that 14 per cent more customers left the store feeling that they had received good service than before the drive was put on. It is reasonable to assume that this meant increased patronage for the store. To put it another way, assuming that the store had 20,000 sales in one day, where there were formerly 10,000 satisfied customers there were now 12,000 who were satisfied, or an increase of almost 3000 each day. From this illustration, it is clear that the increase in satisfactory sales before and after the campaign provided useful information as to the success of such a venture.

b. To judge the effectiveness of a Training Department

Each store should know at the end of a year or period of years whether the general trend is for better or for worse. As is illustrated by the above figures, although the per-

centage of satisfactory sales had jumped from 50 to 64, the figures indicated that one-third of the customers still left the store feeling dissatisfied. To keep a line on the progress, shoppings were made at regular intervals over a period of eighteen months, with the following results:

The number of customers receiving satisfactory service in the first shopping, as mentioned before, was 50 per cent, and after the campaign, 64 per cent. The next month during a rush season, the percentage dropped to 45, the next month 70, and so on month by month. Calculated at six-month periods, the percentages showed a steady increase, beginning at 50, mounting to 58, then to 68; while the figure for the last three months showed that an average of 75 per cent of the customers received satisfactory service.

c. To get the customers' point of view

The reports not only show that some customers were dissatisfied, but, as each transaction is written up as a story in the customer's own language, they show why. Reports of this kind are often a management's only contact with its buying public.

d. To get a line on individual salespeople

In some stores shopping is used as a partial means of selecting employees for special recognition and occasionally for promotion, or to collect data concerning undesirable employees. In addition, buyers frequently know that certain salespeople are not making good, but they do not know why. In a case of this kind a customer's contact with the salesperson is helpful in finding out just what training he needs.

e. To show buyers the necessity of training

A buyer often fails to realize that *his* people need training. If, however, he reads reports such as the following he is often more coöperative.

A customer, for instance, who was looking for madeira napkins asked, "Do you have anything smaller?" The salesperson replied, "What in the world do you want to get them smaller for?"

A customer buying stationery in one store asked, "Will this kind of paper take ink?" The salesperson replied, "Just the same as any other kind."

The following is a conversation between a customer and a salesperson in a Ready-to-Wear Department:

Salesperson (called by floorman): "Can'tcha see I'm busy?" (finally coming over) "How much do you want to pay?"

Customer: "That is immaterial, if I could only get what I want."

Salesperson: "Well, there's no use starting with $25 and going right up. It'd take all day."

Customer went on to say in her report, "The salesperson brought the most ornate dresses she could find, and to each one I remarked that it was too fussy. "Oh no," she said, "that's youthful."

I insisted that I wanted dignity. "My dear miss," she said, "surely these dresses are dignified; and you're too young to dress like an old woman."

At a glove counter:

Customer: "Will you try on the left glove, please?"

Salesperson: We are not allowed to fit both."

Customer: "I do not like the elastic in the wrist; it deteriorates. Do you have the strap at the wrist?"

Salesperson: "No, but elastic is as good as anything."

Customer: "No, washing them as often as this kind of a glove needs to be washed, weakens the elastic."

Salesperson: "But we never have any of our customers bring them back."

Customer: "I suppose not. One would scarcely return a glove that had been washed quite a few times."

Salesperson: "Oh, yes, they would."

Customer: "I wouldn't—."

Salesperson (interrupting): "Yes, you would."

Conversations overheard by customers when shopping:

One salesperson shouting across the aisle: "You'll get sacked with those earrings on."

Other salesperson: "Who'd sack me?"

Salesperson (talking across the aisle): "I have to pay the 'phone bill this noon. It is over $9 this month."

Other salesperson: "Good Lord, why so much?"

Experiences of this kind are exceptions, however, rather than the rule, and reports more often bring out commendable salesmanship and courtesy, as is illustrated in the following extract.

Customer: "Do you carry Sheaffer pens?"

Salesperson: "No sir, we carry the Parker pens. May I show you what we have? Our stock is very complete."

Customer: "I never buy anything else but a Sheaffer. I have to have something though, and I haven't time to go over to Blank's. Let me see what you have."

Salesperson: "Did you wish something for yourself or for a lady?"

Customer: "I want it for a gift for a young girl. Do you always sell the ones with the ring at the top for women?"

Salesperson: "No, many business women prefer the other kind, but the regular lady's pen with the gold ring at the top is very attractive."

(Shows two styles in black and red.)

Customer (reading the tags): "Why is this one $5 while the other one is only $3? I don't see any difference except in the color."

Salesperson: "The red pen is a Parker Duofold with special Duofold point which is made of iridium. It is more expensive because the metal is costly, but it is really economical because the pen point cannot be worn away and no style of writing can destroy its shape. Try it and you will see that it does not spread under pressure."

(Gives customer paper and filled pen to try.)

"It also carries a twenty-five-year guarantee which is an advantage."

Customer: "Do you think she would like the one with the ring?"

Salesperson: "I'm sure she would, and wouldn't you like her monogram engraved on the gold band?"

Customer: "Yes, indeed, the initials are M. N. Y. You may charge and send it, please."

Salesperson (taking down name and address): "Thank you very much, Mr. Young. It will be delivered sometime Friday. Good afternoon."[1]

f. To decide what departments are in most need of training

When a training program is started, it is advisable to know which are the weakest branches of the service, so that operations may be begun in those departments. It may be that the Inspecting-Wrapping-Cashiering service, the Delivery, or Mail Order is a little below par, or that the

[1] From "Playlets," Natalie Kneeland.

Elevator service, the Telephone, Credit, or Selling service needs attention. Shopping is really a conclusive way of measuring the comparative efficiency of these strictly service branches. In one store, for instance, the percentage of satisfaction as shown by the figures was as follows:

	per cent
For Inspecting-Wrapping-Cashiering Service	92
For Delivery Service	89
For Service in Returning Merchandise	90
For Selling Service	54
For Selling Service in Basement Departments	38

Since the Selling service in this store both in the upstairs and basement departments was shown as appreciably lower than the other types of service, training was concentrated on the selling departments.

g. To get a line on special divisions of the service, e.g., knowledge of advertised merchandise on the part of the salespeople

Customers are sometimes annoyed because the salespeople do not seem to know about special merchandise that has been advertised for the the day. In one store, it was found by service shopping that 16 per cent, which is one out of every seven of the salespeople, were unfamiliar with the day's "ad." The manager of the store immediately set to work to improve matters. As the store prided itself upon the quality of its service, he felt that everyone in selling departments should systematically read the advertisements. After working for several weeks on the problem, he asked that another shopping be made, and as a result, customers reported that every salesperson shopped knew about the advertised merchandise.

h. As a check on stock carried

In one store, the merchandise office felt that a certain buyer did not carry goods that the public wanted, and at the same time figures indicated that he did not turn over his stock. The office, however, wanted to get some definite information before the subject was raised with the buyer. Shoppers were sent to the department to ask for specified articles, and records were kept as to whether or not they were in stock. In this case, from a total of 273 articles, 135 were reported out of stock and 138 in stock. Some of the merchandise was said to be on order, but the customers found that the buyer was slow about re-ordering. To check this, the merchandise was asked for again and again, until it finally came in. As a result, the management had definite data as to the condition of the stock, and it was easy to show the buyer the situation from the customer's point of view.

THE COST OF SERVICE SHOPPING

The cost of a sincere attempt to shop the store for service will vary according to the percentage of the selling force which is covered from month to month. In a store with 1000 salespeople, if 10 per cent are shopped each month, 100 reports are available, ten each from ten different shoppers. If these cus-

tomers are paid at the usual rate of $5 for ten transactions, the monthly cost is $50.

The problem of returning the merchandise purchased by shoppers to the various departments may be solved in two ways:

1. The shopper may open a regular charge account and have the articles credited and returned to stock after store hours by the one directing the shopping.

2. The store may supply the shopper with cash to use in buying, return the merchandise to stock after store hours, and deduct the corresponding amount from the sales totals for the day.

Merchandise may be returned by the customer in the regular way, either as a credit or a cash return; but this is necessarily done by the customer himself, and requires time that might be spent to better advantage, except in special cases when the store is being shopped with a view to ascertaining the service rendered to customers who return merchandise.

RELIABILITY OF SERVICE SHOPPING RESULTS

Do figures from a limited number of transactions indicate the efficiency of the store as a whole? To a fair degree we think that they do. There is, to be sure, really no accurate measure of efficiency. Even profits do not take into account the good will of a customer or his desire to return to a store. The method of sampling the service which we have described is logical and systematic, and to that extent the ratings are certainly superior to any haphazard estimate based only on the opinion of a few people.

Samuel Gompers
1850—1924

Samuel Gompers, valient chieftain of organized labor, died December 13, 1924, at San Antonio, Texas. At the hour of his funeral in New York City, December 18, a nation bowed reverently and paid respect to the power and far-sightedness of his two-score years of labor leadership.

Other writers have told the story of Mr. Gompers' life: his boyhood in England; his youth in New York; his apprenticeship as a cigar-maker at the age of 13 and his steady advancement until he became the outstanding figure in the organized labor movement. Others will appraise his work. In this place will be briefly told what he did in his last years for the movement to bring science to bear on questions that affect workers and their work.

In November of 1920, the National Research Council called a conference of twenty-six organizations to see what should be done to plan for coördinated studies in the several fields of industrial employment, by scientific methods, under unprejudiced direction, for the benefit of all concerned. Out of this conference grew the Personnel Research Federation. Mr. Gompers was elected its first Vice Chairman and continued to serve until his death. His attitude toward the movement is best set forth in his own words, chosen from a paper read at this preliminary conference:

"Whatever help research and science can offer, labor will welcome."

"One of the early attempts to apply science to labor questions came with types of scientific management that treated wage-earners as machines or simply laboratory material. Organized labor resisted—that resistance helped to humanize concepts and methods in management, until now the human nature of the workers is recognized as the fundamental factor in determining policies."

"On the administration side of personnel relations, science can make rich contributions if conceived and directed in the spirit of service to mankind. Such efforts would win good-will and confidence by results. Labor is not coming here to question the value of fundamentals that have proved themselves in many tests, but to consider additional methods whereby we can advance both the material and spiritual life of all."

To those who knew Mr. Gompers chiefly as a great fighter for the principles of organized labor, these words may disclose an aspect of his statesmanship and breadth of vision well known to all of us who from day to day came close to him and called him leader.

MATTHEW WOLL.

News Notes

NEW OFFICERS OF PERSONNEL RESEARCH FEDERATION

Announcement is made of the election, by letter ballot of the Board of Governors, of the following officers of Personnel Research Federation:

Chairman, HOWARD COONLEY, President of the Walworth Manufacturing Company, and retiring President of the Boston Chamber of Commerce; 88 Pearl Street, Boston, Mass.

Vice Chairman, SAMUEL GOMPERS, President of the American Federation of Labor, A. F. of L. Building, Washington, D. C. [Since deceased.]

Secretary, COL. ROBERT I. REES, Assistant to the Vice President in charge of Personnel, American Telephone & Telegraph Company, 195 Broadway, New York City.

Treasurer, FRANCIS H. SISSON, Vice President of the Guaranty Trust Company of New York, 140 Broadway, New York City.

Executive Committee, The Chairman and the Secretary, *ex officio*, W. W. CHARTERS, Director of the Research Bureau for Retail Training and Dean of the Graduate School, University of Pittsburgh; FRANK MORRISON, Secretary of the American Federation of Labor, Washington, D. C.; and JOSEPH H. WILLITS, Director of Industrial Research, Wharton School, University of Pennsylvania, Philadelphia.

W. V. BINGHAM, Director of Personnel Research Federation, continues as Editor-in-Chief of the JOURNAL OF PERSONNEL RESEARCH. L. L. THURSTONE, of the University of Chicago, is Associate Editor. The Managing Editor, to whom books for review and articles for abstracting should be sent, is C. S. YOAKUM, of the School of Business Administration, University of Michigan, Ann Arbor, Michigan.

THE RUSSELL SAGE REPORT ON PUBLIC EMPLOYMENT OFFICES

A great deal of quackery and pseudo-science is being exercised in the technique of selecting applicants for employment, and the greater part of the experimentation—scientific and otherwise—that has been carried on in regard to the selection of workers is still comparable to the "home remedies" stage of medicine and surgery, according to an exhaustive report on "Public Employment Offices—Their Purpose, Structure, and Methods," which has just been issued by the Russell Sage Foundation.

The value of the judgment regarding an applicant for work which is based on the look in his eye, the condition of his hands, or the condition of his collar, is minimized in the report, as is also the practice of arbitrarily classifying applicants for employment according to any standard list of types of personalities.

"No system or methods of character analysis has yet produced results which justify its adoption or even suggest its trial in a public employment office," says the Foundation's statement. "This is not to be taken as decrying research in the field, but as a warning against depending too much upon any schemes for rating individuals which appeal to the imagination because of the greatness of the need for something of the kind, rather than because of their demonstrated success.

"The human mind has been grouped by some persons interested in employment questions into types that are presumably mutually exclusive as follows: the executive type; the detail type; the promotion type; the accounting type; the clerical type; the selling type; the mechanical type, and so on. These adjectives do describe attributes of the mind, but that people can be so tagged and labeled fairly is doubtful.

The temptation to label people is very great, but the science and art of successfully doing it have not as yet been discovered."

The report, which is based on a five-year study extending into almost every state in the union and into Canada and England, was prepared by Shelby M. Harrison, Director, Department of Surveys and Exhibits of the Russell Sage Foundation, in collaboration with Mary LaDame, Bradley Buell, Leslie E. Woodcock, and Frederick A. King, all of whom have been closely identified with public and private employment work. Several hundred pages in the report are devoted to methods of organizing and administering a national employment service.

In making the report public, Mr. Harrison said: "The solution of the employment problem depends very largely on the ability of the staff in each local office—and there would be a hundred or more of such offices in the proposed service—to discover, as intelligently as possible, the exact requirements of the job which the employer wants filled, and the capability and adaptability of the individual worker applying for this job."

After reviewing the various methods by which workers get jobs and employers get workers, the report draws the conclusion that these methods are inadequate to the needs both of industry and of the workers; it recommends the establishment of a nation-wide free employment service to be operated jointly by the federal, state, and local governments, and cites the following major reasons for the need of such a service:

1. All of the existing employment agencies combined meet only part of the need, and they leave the employment service demands of many important sections of the country and some important industries entirely undeveloped.

2. In order to reduce unemployment, and at the same time give employers the maximum assistance in securing labor, there is need, among other things, of an employment system national in scope. None of the existing non-governmental agencies offer sufficient promise of development along these lines; nor is there at present any means of coördinating or correlating the activities of the existing agencies.

3. It is necessary, particularly during periods of strike or other active controversies between employer and employee, to have absolute impartiality and this cannot be secured through the existing agencies; methods of attaining impartiality through a combined federal-state-local system of public employment offices are pointed out in the report.

THE MEN THAT INDUSTRY NEEDS

What kind of training does industry expect from men needed for executives, administrative and technical positions?

The National Industrial Conference Board of 247 Park Avenue, New York, has commenced the important task of investigating in the chief basic industries of the country how engineering education may best be adjusted to meet industrial needs.

The board estimates that American industry may need 400,000 more persons for this type of responsible position in 1930 than it used in 1920. This is based on the increasing ratio of administrators, supervisors and technical experts to the total number gainfully employed in industry, as detailed in the United States Census of Occupations.

The board has selected for specific study 10 or 12 major branches of American industry in order to find what technical men are now in industry, what positions they occupy and what are their activities, what further opportunities the industry offers for additional employment of technically trained men, and in what respect the technical colleges may adapt their programs to the practical requirements of industry. The situation in each industry is being studied separately.

The board has now completed the first two of the series of investigations covering the rubber and the pulp and paper industries. Seventy-five companies coöperated with the board, covering 113 plants, over 100,000 employees and representing more than 83 per cent of the rubber industry. The board finds that of the total number of employees, 7 per cent occupy important positions, and

that of these 7 per cent 23 per cent are college graduates.

In the paper and pulp industry, in which 150 companies, representing over 35,000 employees, coöperated with the board, it was revealed that a little more than 7 per cent of the men employed held executive or other important positions, and that of these, 22 per cent were college graduates, 13 per cent being graduates of recognized technical colleges.

One of the problems existing in adapting college graduates to responsible positions in industry is the difficulty of obtaining practical experience in line with theoretical instructions. Several possible ways of accomplishing such an end in some measure are indicated in the reports, such as summer employment and the coöperative college course, and it was found that very few of the companies offer such opportunities to technical college men.

The problem of selection of employment by the college graduates and of men for employment by the companies was canvassed. This showed that quite a considerable number of men, about 60 per cent of the total, had made a conscious choice of the rubber industry as a field for employment. On the other hand, by far the greatest number of college men reported entered the paper industry because of secondary reasons rather than because of any particular interest in or unusual ability for it. In both industries, the companies have so far developed very little in the way of systematic method or in the way of selection of technically trained men for employment and development in the industries.

When the entire series is completed, the findings will be analyzed and compared and published by the board in a composite report on "Technical Education and American Industry." In that report, specific points will be discussed at length and complete sections devoted to each of the industries previously summarized.

A study of the textile industry will be the next in the series, and surveys of the metal trades, chemical industry and automotive industry are in preparation. The board points out that the gratifying coöperation on the part of industrial executives is ample evidence of the importance which industry regards this problem.

GEORGIA COLLEGE PLACEMENT OFFICE

Fifteen Georgia colleges are coöperating in the development of a joint placement service. This significant effort, begun last Spring in order to hold Georgia graduates for industrial service within the state that pays for their education, is described as follows by its Placement Secretary, Mr. J. E. Williford.

The idea of a placement office for Georgia college graduates was introduced to some thousand business men of Atlanta by the following letter from Mr. Cator Woolford, a member of Personnel Research Federation who is promoting the movement:

"I am considering the advisability of organizing and financing a college placement office with a view of placing our graduates from the Georgia colleges in Georgia.

"What do you think of the idea? Would you be in a position to coöperate by taking one or more of these graduates each year?

"My idea is that we are losing considerable man power and brains by not placing our graduates in Georgia. We feel the loss of a negro who moves North; then how much more do we feel the loss of a high class young man with a college education who locates in the north or rather leaves Georgia.

"My plan would be to have each college coöperating furnish a representative and then we would select one representative from industry to match him. These representatives would constitute the Board of Control, the central office would be located in Atlanta and the services would be given without any expense to the employee or employer.

"An expression from you on this subject would be appreciated."

The response was very favorable. A few weeks later a joint meeting was held of a number of representatives from the colleges and industry and the Georgia College Placement Office was formally organized.

Its purpose, as expressed in the by-laws, is "to create a contact between the colleges of Georgia and the industries and other business of the state, whereby the college boys and girls of the state will have a better opportunity of finding employment after they have discontinued their studies or have completed same by graduation."

A very complete application form was drawn up and the placement secretary, with Mr. Woolford, made visits to the various colleges to explain the purpose of the office, and to interview the applicants for positions. Two hundred and fifty-nine registrations were received and were catalogued in a very attractive printed bulletin giving the history of each applicant's record both personal and scholastic. This bulletin was mailed to a thousand interested employers.

In this manner employers are enabled to select absolutely without cost those graduates whose qualifications conform most nearly to their requirements. Their choice from the catalog is reported to the placement secretary and an application sheet of each designated number is then mailed out with a complete scholastic record attached. An interview is arranged for *only after* the employer has had time to study the applicant's record.

Of the total number of registrations on file originally only sixty-two were available October 1st, a very creditable showing for a new organization.

Mr. Woolford is bearing the entire expense of the office and its management himself and has agreed to do so for at least two years, at the end of which time he hopes that the colleges will take the work over.

The Georgia College Placement Office restricts its registrations to 1924, so that there is no conflict with the work of the other placement offices. At present we are making a survey of industries which may have openings for college graduates and we hope to print soon a pamphlet showing the opportunities for these Georgians in their own state. During the winter we shall continue our visits to the employers and to the colleges to prepare for registrations in the Spring.

PERSONAL ITEMS

During September and October, Prof. Dr. Georg Schlesinger, engineer on the faculty of the Technische Hochschule in Charlottenburg-Berlin, visited American industries and university centers in search of results of psychotechnical investigations in the selection and placement of employees. He was surprised to find so much indifference on the part of large employers of labor to the necessity of thorough-going, painstaking, long-time investigations into vocational requirements and methods of determining aptitudes. On November 10th, Dr. Schlesinger lectured at Columbia University, illustrating in detail the psychotechnical research methods which have been developed in recent years at the Technische Hochschule by Dr. W. Möede, and described from time to time in the journal, "Industrielle Psychotechnik."

AMERICAN FEDERATION OF LABOR

Forty-fourth Annual Convention

The El Paso Convention of the American Federation of Labor, November 17 to 20, 1924, was notable for a harmony of opinion and action that had not been confidently expected in all quarters. The newspapers generally gave wide publicity to the actions of the convention, foremost of which was the reëlection of the veteran President, Samuel Gompers. They gave space to the carefully prepared report of the special committee on Insurance, submitted by Matthew Woll and G. W. Perkins, which presented the pros and cons of group insurance. This report discussed the possibility of organized labor establishing a capital stock company to be owned by the American Federation of Labor and its constituent elements and their members, and directed by the heads of these organizations, the company to operate on the legal reserve system and on the participating policy plan only, and to write both ordinary and industrial forms of policies. The committee was fully persuaded that it is advisable for the Union to adopt some form of appropriate insurance, but opposed the plan of having the American Federation of Labor as such actually engaged in the insurance business. This recommendation met with the approval of the convention.

Other important recommendations of the Executive Council adopted by the convention have to do with the child labor constitutional amendment, labor and the courts, workmen's compensation laws,

railroad labor legislation, old age pensions, and women and industry.

Labor and Education

Of special interest to our readers is the forward-looking report of the Committee on Education in which it is recognized that the public schools have to a large extent taken over apprentice training which formerly was under Union control, hence, the need for Labor to be identified with the determination of both local and national policies for industrial education and vocational training. Member organizations are urged to provide opportunities for advanced technical education for their membership. The program of the Workers' Education Bureau in providing non-technical education for adults is cordially endorsed. The report concludes with the hope that in the coming year every labor union and labor organization will authorize an educational agency to insure responsibility for meeting the educational needs of its own membership and to coöperate for the promotion of general educational understanding and purposes.

Labor and Research

The following recommendation of the Executive Council with reference to Personnel Research Federation was unanimously adopted:

"The American Federation of Labor has been identified with the Personnel Research Federation since its organization through the auspices of the National Research Council. Up to the present the organization has been able to do little except call attention to the problems in this field and to direct research agencies to specific problems and to make generally available information of inquiries in progress or the findings of studies. Even such limited work has been definitely valuable.

"There are now in the making plans to finance the Federation for sustained and active work. Contributions have been pledged for five years so that a budget is assured permitting the employment of a director and the maintenance of an office.

"Planning upon a basis commensurate with the budget now assured, the central office has outlined a number of research undertakings now under consideration which would develop information of direct assistance to labor organizations. All data and findings our Federation office will of course render available to labor executives who in turn can indicate additional fields in which research would be helpful to them.

"Since the field of personnel research is closely interrelated with the development of management policies, it is of utmost importance that Labor maintain its present contacts with this research, and widen them as rapidly as may be practicable.

"Management in industry is primarily responsible for the profitableness and the productiveness of the undertaking as well as labor policies. The A. F. of L. has, through participation in the work of this research federation, an opportunity to contribute to development of fundamental policies of utmost importance to the well-being of labor as well as to the material progress of our civilization.

"We recommend continuation of membership in the Federation and as active participation in the work of the bureau as possible. Our representation on the board of governors should urge trade union representation on those agencies directly concerned with the development of specific research projects.

"There is hardly any research undertaking in the industrial field which should not consider the labor element involved for human intelligence in production, whether in planning or in execution, as an irreplaceable factor. With the development of industrial research, it becomes of increasing importance that the labor movement be alert and active to take advantage of all opportunities to participate in this field and to create opportunities where none are offered. Because the labor movement has not at its disposal the large funds necessary to finance research undertakings, it becomes imperative that we avail ourselves of all collective efforts in which we may participate with confidence in the integrity of the purpose and methods of the undertaking, and whenever possible we should participate financially to the extent of our ability."

Book Reviews

TRAINING FOR THE PROFESSIONS AND ALLIED OCCUPATIONS

Facilities Available to Women in the United States

By the Bureau of Vocational Information, Emma P. Hirth, Director, Beatrice Doerschuk, Assistant Director. New York: Bureau of Vocational Information, 1924. Pp. xii—742

Reviewed by Elizabeth H. Marston

This handsome volume "meets the need, widely recognized, for up-to-date, authortative information regarding training facilities available to women in this country." It is at once a directory of training facilities, a digest of opportunities and a survey of recognized occupational requirements.

This report is divided into twenty-three sections "each one of which deals as a unit with an important occupational field." These are Agriculture, Architecture, Art, Business, Dentistry, Dramatic Work, Education, Engineering, Home Economics, Landscape Architecture, Languages, Law, Library Work, Medicine, Music, Nursing, Personnel Work, Pharmacy, Public Health, Religious Work, Science, Social Work and Writing.

The broad divisions are again subdivided. Business, for instance, is treated under the several headings of Accounting, Advertising, Banking and Finance, Commerce, Industry, Insurance, Real Estate, Research and Statistics, Secretarial Work, Teaching of Business Subjects, Trade and Business Organization Work. In all, seventy-four professions or allied occupations are discussed.

"Committees of experts representing several professions treated, especially those of law, medicine, home economics and agriculture, held meetings to discuss the sections dealing with their respective fields. All sections have been read and criticized by leaders, both men and women, some hundred and ten in all, representing their various professions." As a result, the sections devoted to "scope of the field" and "position of women" are sound and, by the same token, not over encouraging. It is a fact that in positions requiring technical training and knowledge of business practice women are still handicapped by inadequate preparation, instability in employment and prejudice.

This directory is adequate in scope and as accurate as any monumental compilation of this character could be made in its first edition. It is carefully indexed. The size of the volume, the print, the spacing of sections make it easy to use. As a reference book, this thorough survey will prove invaluable to the many persons interested in the effective vocational guidance of women as well as to the thousands of college girls who are giving serious thought to the choice of a career.

CREATIVE SALESMANSHIP

By Herbert W. Hess. Philadelphia: J. B. Lippincott Company, 1923. Pp. 333

THE LEADERSHIP OF ADVERTISED BRANDS

By George Burton Hotchkiss and Richard B. Franken. Garden City: Published for the Associated Advertising Clubs of the World, Doubleday, Page and Company, 1923. Pp. xii + 256

REVIEWED BY JOHN CALHOUN BAKER

The subtitle of Professor Hess's book, "Scientific Ideas for Salesmen, Sales Managers and Sales Administrators," describes it completely. The book contains discussions on nearly every subject related to selling and salesmen.

The author included chapters on the history of salesmanship or commerce, the functions of sales executives, the sales manager and the selection and training of salesmen, besides the usual chapters concerning salesmen, their personality, the buyer, the choice of appeals, the elements of sales talks and similar points. The additional subject matter increases the number of persons to whom "Creative Salesmanship" should appeal.

The thought of the entire book is obscured by the author's involved style. Many sentences must be reread several times in order to grasp the author's full meaning. An example of this is the following sentence from the paragraph on "Sales manship and Human Attributes," page 11: "Salesmanship, at first an incident to commerce, has slowly nutured the human attributes which a broadening mechanistic age slighted, and foresees the need for introspection in a regime that measures its progress in terms of objects and things."

At the end of each chapter there is a series of questions. These questions assist the reader to summarize and grasp the main points in the chapter.

In the latter chapters dealing with sales administrators, sales managers and the selection and training of salesmen the author contributes numerous ideas on these subjects of value to sales executives. Considered as a whole, however, this book is not an outstanding one—even in a field where there is a paucity of worth while books.

"The Leadership of Advertised Brands" is one of the series of advertising studies made by the Bureau of Business Research of New York University.

An attempt is made in this book to determine the advertised brands with which the public is most familiar. The study of 100 nationally advertised commodities is based on the reactions obtained from 1024 men and women students attending 15 universities and colleges in different sections of the United States.

Each group tested was given instructions verbally. The method employed to secure reactions was as follows: "Each subject was asked to write down the specific manufacturer's name or brand that came to his mind most quickly when a general commodity was mentioned such as bacon, baked beans, breakfast food, butter, etc."

The book is prepared in a logical manner and the different steps are carefully explained and defended. The explanation for basing the survey on college students is, however, not convincing. If the title of the book were "The Leadership of Advertised Brands Among College Students," one could agree with the survey without question. Under its present title, however, it is believed that the survey, to be conclusive, should have been made with actual consumers of the products. The majority of college students, furthermore, belong to the middle class and it is doubtful therefore if the great mass of purchasers were represented in the survey. A selected rather than a free cross section of the market was secured.

A scientific approach to advertising problems is needed. This book is a step in the right direction.

Abstracts

The Uses of an Occupational Classification of Positions. Public Personnel Studies, October, 1924, Vol. 2, No. 7, pp. 220–225.

In classification matters, the two things of outstanding importance are (1) the individual position or job and (2) the smallest group of individual positions or jobs which may be grouped together and treated as a unit for employment purposes; i.e., the class. Both of these terms are carefully defined.

The essentials of the modern occupational classification are the classification plan and the allocation of positions to classes. The classification plan is a list of classes showing for each the table, the definition or description of the class, the qualifications required and desired, and frequently the lines of promotion. In respect to the one essential, the allocation of positions to classes, little is said. After the classification plan has been developed and put into effect and the individual positions have been allocated to classes, the system can be of great use in:

1. Holding tests and certifying eligibles
2. Developing a compensation plan
3. Developing and administering service (efficiency) rating systems
4. Handling transfers
5. Giving publicity to required qualifications
6. Providing a common employment terminology

It is of utmost importance that the one classification should be so formulated that it can be used for all of the foregoing purposes.

Suggested Tests for Fire Fighter. Public Personnel Studies, October, 1924, Vol. 2, No. 7, pp. 226–234.

Lists the duties and qualifications of Fire Fighter. As used in this article, the term Fire Fighter includes the men assigned to the hook and ladder, to the hose wagon, to the chemical apparatus or to driving a piece of fire apparatus.

The main considerations used in choosing tests to select qualified incumbents were (1) intelligence and (2) medical and physical requirements.

The following tests are suggested for selecting fire fighters:

TEST		TIME	WEIGHT
1	One of the five alternative forms of the army alpha intelligence tests (a minimum required score of 55).....	60	2
2	Accuracy of observation (20 questions based on a photograph of a fire scene, to be answered from memory).....	15	1
3	Understanding of printed material relating to a Fire Fighter's work (20 questions based on the context of printed or typewritten material placed in the hands of competitors when the test is given and dealing with some phase of fire fighting or with the rules and regulations of the department).....	20	1
4	Information and judgment (20 questions in the so-called multiple choice form with four answers from which to choose, each question dealing with some item of information which a fire fighter ought to have or with some matter of judgment.....	15	1
5	Memory for verbal orders (10 questions on one or more verbal orders, such as may be given to a Fire Fighter by his superior to be answered from memory).....	10	1
6	Education and experience.....	10	1
7	Medical tests of physical condition, and physical tests of strength and agility.....		3

A complete set of the tests is given in appendix 1 of the article. Reasons are

also given for selecting the tests and the material in them as well as suggestions as to how to give and score them.

The Printing Trade in Philadelphia. CHARLES L. WOOD, JR. Psychological Clinic, May–June, 1924, Vol. 15, Nos. 6 and 7, pp. 182–202.

The Textile Industry in Philadelphia. ELLIOTT CADES. Same Journal, pp. 203–228.

These articles illustrate by detailed reports on two specific trades, the methods of job analysis being developed at the University of Pennsylvania under the direction of Professor Viteles. Each of the reports discusses the history of the industry; its importance and status in Philadelphia; description of different positions; conditions of work; openings for boys and girls; methods and opportunities for training; and the advantages and disadvantages of the occupation.

The feature of the reports not usually emphasized in studies of this type is the attempt to make an intensive analysis of the mental and physical requirements for each of the vocations. The results of this analysis are embodied in a chart which is called the "job psychograph" and forms a a part of each job specification.

"In preparing the "job psychographs" . . . . use was made of the form suggested by Viteles. . . . . In the psychographs a check opposite an ability represents the judgment of several employing printers in Philadelphia combined with the writer's as to the minimum amount of any ability required by the job for success in it." For example, for a pressman, "alertness" is required in maximum amount, but "initiative" is of practically no importance for job success.

These specifications and psychographs are intended primarily for use in vocational guidance.

Human Service in Industry. DR. OTTO P. GEIER. National Safety News, October, 1924, Vol. 10, No. 4, pp. 43–44.

Discusses the general importance of health service in industry. Summarizes the principle points both for the internal economy of the plant and for the individual worker and his family. Mentions the danger of self repression under modern working condition; the necessity for continued follow-up after the first physical examinations; the importance of the all-day clinic to reduce preventable sickness and loss of time from accidents.

Do You Tell Employees Periodically Just How They Stand? STANLEY ROTH. American Management Review, October, 1924, Vol. 12, No. 10, pp. 3–4.

Tells how the plan of scheduling every employee for review once each six months worked. The review consisted in investigating each person's work, in studying the efficiency records, interviewing department heads, and estimating future possibilities. Labor turnover has been reduced, certainly partly due to the new plan; requests for salary raises much less frequent; the training staff finds it easier to do individual follow-up training; transfers and promotions can be made more intelligently. Employees are beginning to understand the purpose of the personnel office. "We learned more about our people themselves, about their fellow-workers, about departmental conditions, got more good suggestions, and (seemingly at least) engendered more good will for the house than we had in any other single way."

A Salesman's Chance to Succeed. WINSLOW RUSSELL. Business, October, 1924, Vol. 6, No. 1, pp. 18 ff.

Tells how the Phoenix Mutual Life Insurance Company applied experiment and research to the selling of life insurance. In the first experiment, the company changed from the usual custom of the time of hiring any one who thought he could sell and letting him spend as much or as little time on the work as he chose, to an application of the principle that if men are devoting all their time to selling they turn in more business. In 1914, the company had 1700 licensed agents. These were weeded out till, in 1923, the company was working with 400 full time men. The business turned in for the year 1914,

amounted, in volume, to 21 millions; in 1923, the volume of business had increased to 52 millions. While this experiment was in progress, the company organized a sales research division and a training school. The research division set out to study the qualifications and practices of successful salesmen, to study markets and buyers, and to transmit the findings to all managers. "The chief elements, we found, that indicate the ability of a potential salesman to succeed can be grouped under eleven heads. They are: his age; the number of his dependents; whether he is married or single; the extent of his schooling; the number of years that have elapsed since he left school; the extent—if any—of his selling experience; the number of organizations to which he belongs; the number of organizations in which he is an officer; whether or not he owns his home; the number of his investments, if any; and the insurance he carries."

Article gives in detail the steps taken to select the new salesman. Also gives the present standards of the company on the basis of their experience.

Sex Differences in Character as Indicated by Teachers Ratings. HORNEL HART AND ELMER OLANDER. School and Society, 1924, Vol. 20, No. 508, pp. 381–382.

That girls are decidedly more sincere, more earnest, more energetic and more kind than boys is the clearly indicated opinion of those men and women teachers who rated students in a study made recently in Davenport by the Iowa Child Welfare Research Station.

Ffty high school boys and fifty high school girls were rated by three or more teachers on sincerity, kindness, self-control, honesty, energy and intelligence. The comparable average ratings by the men and the women teachers upon the same pupils were computed. From each of these averages the general average, based upon all the ratings for a single given trait, was subtracted and the result divided by the standard deviation of all the ratings for that trait.

Results also suggest the tentative conclusion that men tend to be more lenient in their ratings than women.

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